

REMARKS/ARGUMENTS

The examiner has rejected claims 31-46 under 35 U.S.C. § 103(a) as being unpatentable over Morikami et al. in view of Ho. In response to this rejection applicant has amended the claims to more particularly define the invention. Applicant submits that the amended claims are patentably distinguished over the cited references for the reasons discussed below.

Before discussing the issues raised by the examiner in the office action, applicant first wishes to thank the examiner for the courtesy extended to the below signed attorney during the interview on January 9, 2004. The following remarks constitute a separate record of the substance of the interview as well as additional comments in support of the patentability of the claimed invention.

The claims have been amended to include the limitations discussed during the interview. In particular, the claims now require that although the molded resin covers the chip, conductive elements, solder mask portions, lead portion of the layer and the die pad layer, no other support is provided for the chip adhered to the die pad surface, conductive elements connected to the chip and to the lead portion of the layer, solder mask portions, lead portion of the layer and die pad layer. In other words although the molded resin adheres to the aforementioned components on a top portion thereof to thereby support these components, no other specific support elements are utilized. The claims previously recited that these components are unsupported. However, the examiner noted during the interview that the molded resin will inherently provide support for these components. Accordingly, the claims have been amended to expressly state that which was clearly inherent in the previous version of claims 31-46.

The claims have also been amended to require that the solder mask portions, the lead portion of the layer and the die pad layer have a coplanar bottom surface. As illustrated in the drawings, this coplanar bottom surface is the surface which is remote from the portion coated by the molded resin (i.e., the bottom surface which is not in contact with the molded resin). In view of this limitation, it has become necessary to cancel claims 45 and 46 since these claims are directed to a slightly broader embodiment which requires that at least one side of the single layer (i.e., the layer containing the solder mask portions, lead portion of the layer and the die pad layer) has a surface which is coplanar without requiring that it is more specifically the bottom surface which is coplanar. In other words claims 45 and 46 must be cancelled because they do not further limit the presently amended version of claims 31 and 38 respectively.

Turning now to the rejection, it is to be noted that Morikami pours resin 104 into etched-out portions of metal plate 100 as shown in step D in figure 9. Next, the back side of metal plate 100 is etched in the same manner to produce the structure shown in step E of figure 9. The resin 104 provides support for interposer 15 which includes studs 12, die pad 16 and land 14.

It is noted in the specification that interposer 15 having the die pad 16 land 14 and studs 12 is made by the procedure illustrated in figure 9 (see column 5, lines 38-41). Thus it is clear that the studs 12, die pad 16 and land 14 of the interposer are supported by the resin of substrate 1 and that the molding resin 11 provides further support for the structure. In other words in addition to the support provided by molding resin 11, stud 12, die pad 16 and land 14 are also supported by the polymeric substrate 1 which corresponds to epoxy resin 104 shown in figure 9. In contrast, the corresponding components in applicant's

invention are only supported by the inherent support capability of the molded resin which corresponds to molding resin 11 of Morikami.

In view of the above, it is clear that the presently amended claims are not disclosed or suggested by the prior art references.

The presently claimed invention is also further distinguished over the cited references since the bottom portion of applicant's claimed device is necessarily flat. The flat bottom surface is obtained because the components of the bottom portion are applied to a flat substrate which is eventually removed. In contrast, the process described by the prior art inherently results in a bottom surface which is not flat due to the etching Morikami requires to produce his product. As noted above, Morikami etches both sides of the metal plate as illustrated in figure 9 and thus it is not possible for Morikami to obtain a semiconductor package wherein the solder mask portions, lead portion of the layer and the die pad layer have a coplanar bottom surface (i.e., the surface which is not in contact with the molded resin). Accordingly, the limitation in the claims which requires the aforementioned coplanar bottom surface further distinguishes the invention over the cited references.

In rejecting the claims the examiner also alleges that it would be obvious to replace the substrate resin 1 of Morikami with the solder mask of the secondary reference (Ho). Applicant most respectfully disagrees with the examiner on this point. In this regard it is to be noted that the resin of substrate 1 used by Morikami is not described as a solder mask. Instead, Morikami uses plating pads 101a and 101b as masks. Accordingly, one skilled in the art would not be motivated to replace substrate resin 1 (which is not a solder mask) with the solder mask of the secondary reference. At best, it would only be obvious to

replace the mask layers used by Morikami with the mask layers used by the secondary reference. However, such a substitution will not result in the linear arrangement required by the claimed invention since the plating pads 101a and 101b are not co-linear with the other components of the single linear layer. Moreover, one skilled in the art would not be motivated to substitute a non-masking material with a solder mask material.

Lastly, it was pointed out during the interview that the purpose of Morikami is to improve the traditional BGA structure. The substrate 1 has a through-hole 4, and the through-hole 4 is formed with the plating 5 and the chip 2 is connected to the wiring pattern 3 by bonding wire 7. This will, however, produce higher cross-talk noise and thermal stress. The purpose of applicant's invention is to improve the LIF structure and to solve the loss of wiring force problem caused by the adhesive tape adhered to the bottom of LIF during the wiring process. Thus, the objectives of applicant's invention and the objectives of the prior art are completely different. Furthermore, the invention of Morikami is to improve the defect of the BGA structure whereas applicant's invention is to improve the LIF structure. Thus the objectives of applicant's invention and the objectives of Morikami are different.

Lastly, the examiner notes in the office action (page 12, lines 10-21) that the subject matter of the invention relates to the structure and that the function of the stud used by Morikami is identical to the conductor layer used in applicant's invention. Thus the examiner considers that the two final structures are similar. However, it is to be noted from the process shown in figure 9 of Morikami that the mask consists of plated metal 101a, 102a, 101b, 102b, and that etching of the metal plate 100 produces a hole into which epoxy resin is injected. In applicant's invention, the metal plate is a temporal substrate for the chip and the conductive

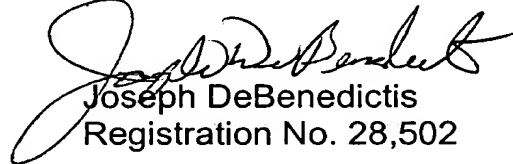
layer. After the molding and cutting, the metal plate is removed by etching. Thus the process used by Morikami is totally different from applicant's process. Furthermore, the stud used by Morikami is different from the conductive layer used in applicant's invention.

In view of the above arguments and further amendments to the claims, applicant respectfully requests reconsideration and allowance of all the claims which are currently pending in the application.

Respectfully submitted,

BACON & THOMAS, PLLC

Date: February 6, 2004


Joseph DeBenedictis
Registration No. 28,502

BACON & THOMAS
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314
Phone: (703) 683-0500

S:\Producer\jdb\JAW HWA\HUANG 736225\A05.wpd